

REMARKS

This responds to the Office Action mailed on August 8, 2005.

Claims 7 and 28 are amended; as a result, claims 1-30 are now pending in this application. No new matter was added by these amendments.

Claim Objections

Claim 7 was objected to. Claim 7 has been amended to eliminate the typographical artifact. Withdrawal of the objection is respectfully requested.

§102 Rejection of the Claims

Claims 1, 3-5, 8, 9, 14 and 17-23 were rejected under 35 USC § 102(b) as being anticipated by Hyoudo et al. (U.S. 6,365,433). Applicant respectfully traverses this rejection and requests the Office to consider the following.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” (*Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), M.P.E.P. §2131, 8th Ed., Rev. 1). Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). It is not enough, however, that the prior art reference discloses all the claimed elements in isolation. Rather, “[a]nticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, *arranged as in the claim*.” *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (emphasis added). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP § 2131.

The Office Action asserts that Hyoudo discloses that the first via 35 is “disposed symmetrically and directly below the first wire-bond pad” (Office Action at pages 2 and 3).

Applicant respectfully disagrees. The electrode 27 of Hyoudo is not centered on the via 35, as scrutiny will reveal. For example, the via hole 35 in FIG. 2B is 4.9 units from the right edge of the electrode 27, and 4.1 units from the right edge of the electrode 27. Further, the via hole 35 is 2 units below the top edge of the electrode 27 and 2.8 units above the bottom edge of the electrode 27. That the via 35 below the electrode 27 is merely incidental to Hyoudo's disclosure, is made more clear by an unmarked via in FIG. 2B, which is more clearly not symmetrically and directly below Hyoudo's electrode 28. Because Hyoudo's vias are not symmetrically and directly below Hyoudo's electrodes, withdrawal of the rejections is respectfully requested.

Regarding claim 3, Hyoudo does not teach a liner in a via. The Office asserts that structure 22a in Hyoudo is a liner. It is "first main surface 22a" of the substrate 21.

Regarding claim 5, Hyoudo does not teach a liner and an interconnect in a via.

Regarding claim 8, Hyoudo does not teach "die disposed on the first surface", rather, a chip 29 that is disposed on a roundish structure (not labeled), that in turn is disposed on an island section 26 that likewise in turn is disposed on the first surface 22a. Withdrawal of the rejections is respectfully requested.

Claims 2, 8, 9, 11, 12, 15, and 16 were rejected under 35 USC § 102(b) as being anticipated by Horiuchi et al. (U.S. 6,084,295). Applicant respectfully traverses this rejection and requests the Office to consider the following.

The Office Action asserts that "Horiuchi discloses, referring primarily to figures 4 and 5, an article comprising ... a first wire-bond pad (22) ... and a first via (18) ... wherein the first via is disposed directly below the first wire-bond pad" (Office Action at page 4). Applicant respectfully disagrees. Horiuchi teaches "[s]ince it is impossible to form the bonding pad 22 and the land 24 at the through-hole, they are provided on the peripheral edge of the via 18" (Horiuchi at column 3, lines 63-65). Consequently, Horiuchi teaches the contrary of this claim limitation and therefore does not anticipate what is claimed. Withdrawal of the rejection is respectfully requested.

Regarding claim 8, since Horiuchi teaches "the bonding pad 22" is "on the peripheral edge of the via 18", the limitation of claim 8, of "wherein the first via is disposed symmetrically and directly below the first wire-bond pad", cannot be met in Horiuchi. Claim 9 depends from claim 8, but also is not taught by Horiuchi since Horiuchi teaches "the bonding pad 22" is "on

the peripheral edge of the via 18". Regarding claim 12, the Office asserts that structure 24 is a trace. Horiuchi defines it as a "land 24" (Horiuchi at column 3, line 55 et seq). Regarding claim 15, since Horiuchi teaches "the bonding pad 22" is "on the peripheral edge of the via 18", Horiuchi cannot meet the limitations of claim 15 of "directly above". Regarding claim 16, since Horiuchi teaches "[s]ince it is impossible to form the bonding pad 22 and the land 24 at the through-hole, they are provided on the peripheral edge of the via 18" (Horiuchi at column 3, lines 63-65), the limitation of claim 16 that "each bump is directly below a corresponding via" cannot be met in Horiuchi. Withdrawal of the rejection is respectfully requested.

The Office Action also asserts that "Horiuchi discloses a package comprising: a wire-bonding mounting substrate (5) ... a first wire-bond pad (22) ... a first via (18) ... a second wire-bond pad ... a second via ... and wherein the first via and the second via are staggered with respect to the first edge" (Office Action at page 4). Applicant respectfully disagrees. Firstly, the Office has not identified a "first edge" in Horiuchi. Secondly, the vias that are disclosed are illustrated in a linear arrangement and not in a staggered arrangement as claimed and illustrated in the instant application. Withdrawal of the rejection is respectfully requested.

Claims 24-27 were rejected under 35 USC § 102(3) as being anticipated by Huemoeller et al. (U.S. 6,784,376). Applicant respectfully traverses this rejection and requests the Office to consider the following.

The Office asserts that Huemoeller teaches "wherein forming proceeds from the second surface toward the first surface". Applicant respectfully disagrees. Item 20 is a "molded substrate" formed during the injection-molding process by pre-placement of the "metal tool foils 12 and 13" which "have generated voids". Because flow of the injection-molded substrate 20 is from a lateral approach as illustrated in FIG. 1, forming is indeterminate but definitely cannot proceed from the second surface toward the first surface. Withdrawal of the rejection is respectfully requested. Claims 25-27 depend from claim 24 and are therefore also not anticipated by Hoemoeller. Withdrawal of the rejections is respectfully requested.

§103 Rejection of the Claims

Claims 6 and 7 were rejected under 35 USC § 103(a) as being unpatentable over Hyoudo in view of Huemoeller. Applicant respectfully traverses the rejection and requests the Office to consider the following.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vacek*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (M.P.E.P. §2143 8th Ed. Rev. 1).

The Office Action admits that Huemoeller does not teach symmetrically disposed vias. And as set forth above, Hyoudo also does not teach this limitation. Therefore, Hyoudo in connection with Huemoeller does not teach or suggest the limitation of the independent claims, that the first via is disposed symmetrically and directly below the first wire-bond pad. Applicant respectfully asserts that the motivation to combine the references can come only by using Applicant's disclosure as a guide. Further, Applicant respectfully asserts that all the claimed limitations are not taught in the combined references. Withdrawal of the rejection is respectfully requested.

Claims 8, 10, and 28-30 were rejected under 35 USC § 103(a) as being unpatentable over Wenzel (US 6,812,580) in view of Hyoudo. Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action admits that "Wenzel does not specifically state that the via is symmetrically below the pad" (Office Action at page 8). The Office Action appeals to Hyoudo to fill this void. As set forth above, Hyoudo does not teach symmetrical placement of the via below the pad. Because all the limitations of the claims are not taught in the cited references, withdrawal of the rejections is respectfully requested.

Regarding claim 10, Wenzel does not teach varying lengths of bond wires. The lengths are completely utilitarian, e.g., beginning a pad 28, and ending at a bonding post 38. Wenzel is

concerned with bond wire spacing, but is silent on bond-wire length. Withdrawal of the rejection is respectfully requested.

Regarding claim 28, the Office Action admits that “Wenzel does not specifically state that the via is symmetrically below the pad.” Applicant agrees. But as set forth above, neither does Hyoudo. In fact, the lateral variance from symmetry of the via 35 below the electrode 27 is about 20 percent, and the vertical variance from symmetry is about 40 percent. Hyoudo’s electrode 28 and the unmarked via hole beneath it is visibly asymmetrical at first glance, and Hyoudo’s electrode 28 and the via hole 35 beneath it is also asymmetrical. Hyoudo therefore does not teach, suggest, or appreciate via and bond pad symmetry. Consequently, neither Hyoudo nor Wenzel teach what is claimed. Withdrawal of the rejection is respectfully requested.

Claim 13 was rejected under 35 USC § 103(a) as being unpatentable over Horiuchi in view of Egitto (US 2003/0147227). Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action admits that Horiuchi does not specifically state that the first bump (12) is coupled to the first via (18); and a larger substrate coupled to the first bump. Applicant has pointed out, with respect to claim 8 (from which claim 13 depends), since Horiuchi teaches “the bonding pad 22” is “on the peripheral edge of the via 18”, the limitation of claim 8, of “wherein the first via is disposed symmetrically and directly below the first wire-bond pad”, cannot be met in Horiuchi. Thus Horiuchi also fails to teach this limitation in claim 13. The appeal to Egitto et al., with the statement that “it is well known in the art to attach a semiconductor device to a larger substrate” (Office Action at page 10), does nothing to remedy the deficiencies of Horiuchi. Because all the claim limitations are not taught in the cited references, withdrawal of the rejection is respectfully requested.

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Title: BOND FINGER ON VIA SUBSTRATE, PROCESS OF MAKING SAME, PACKAGE MADE THEREBY, AND METHOD OF ASSEMBLING SAME

Assignee: Intel Corporation

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney John Greaves at 801-278-9171, or the below-signed attorney at (612) 349-9592, to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date Oct. 10, 2005

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 11th day of October 2005.

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